

Appl. No. 10/617,155
Amtd. dated August 25, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-20 (cancelled)

Claim 21 (previously presented) A watercraft comprising:

- a.) a generation means comprising at least one electric generator that converts human kinetic energy to electrical energy,
- b.) a propulsion means comprising of at least one electric motor and at least one apparatus for converting the motor torque to propelling thrust,
- c.) an energy storage means configured to receive and store electrical energy, and further configured to supply electrical energy to the said electric motor.
- d.) a first control means to control the loading characteristics of the said generator according to an operator-adjustable function of a load point parameter of the generator, and
- e.) a second control means to control the electrical power supplied to the said electric motor as a function of a load point of the said generator.

Claim 22 (previously presented) The watercraft of claim 21 wherein the said first control means is arranged to control the loading characteristics of the said generator according to an operator-adjustable function of a load point parameter of the generator and time.

Claim 23 (previously presented) The watercraft of claim 21 wherein the first control means is arranged to control the generator torque according to an operator-adjustable function of the generator speed.

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Claim 24 (previously presented) The watercraft of claim 21 wherein the first control means is arranged to control the generator current according to an operator-adjustable function of the generator voltage.

Claim 25 (previously presented) The watercraft of claim 21 wherein the said second control means is arranged to control the electrical power supplied to the said electric motor as a function of a load point of the said generator and an operator adjustment.

Claim 26 (previously presented) The watercraft of claim 21 wherein the said second control means is arranged to control the electrical power supplied to the said electric motor as a function of the speed of the said generator and an operator-adjustable gain factor.

Claim 27 (previously presented) The watercraft of claim 21 wherein the second control means comprises an electronic circuit configured to receive a signal representative of the desired electric motor operating point, and the electronic circuit configured to control the electric power supplied to the electric motor as a function of the received signal.

Claim 28 (previously presented) The watercraft of claim 21 wherein the energy storage means and the second control means are arranged to supply the said electric motor substantially more electrical power than that produced by the said generator, thereby enabling the propelling of the watercraft at a speed substantially higher than that achievable via the power supplied by the said generator alone.

Claim 29 (previously presented) The watercraft of claim 21 wherein the energy storage means is comprised of rechargeable batteries.

Claim 30 (previously presented) The watercraft of claim 21 wherein the energy storage means is comprised of a flywheel energy storage system.

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Claim 31 (previously presented) The watercraft of claim 21, further including a photovoltaic solar panel.

Claim 32 (previously presented) The watercraft of claim 21 wherein the said generator produces AC power, and the said first control means comprises an electronic circuit configured to rectify the AC power produced by the said generator to a DC power at a voltage compatible with the said energy storage means, and the electronic circuit further configured to receive a signal representative of a desired amount of power flow from the generator to the said energy storage means, and the electronic circuit further configured to control the power flow from the generator to the said energy storage means.

Claim 33 (previously presented) A watercraft comprising:

- a.) an energy storage means for storing electrical energy,
- b.) a human-powered generator converting mechanical power to electric power,
- c.) a first electronic circuit configured to condition the electric power produced by the said generator to a DC power at a voltage compatible with the said energy storage means, the first electronic circuit further configured to supply an operating point signal representative of the said generator load operating point, and the first electronic circuit further configured to control the power flow from the generator to the said energy storage means according to a received generator command signal,
- d.) a propulsion unit comprising of at least one electric motor and propeller,
- e.) a second electronic circuit configured to control power flow from the said energy storage means to the said electric motor according to a received motor command signal,
- f.) a third electronic circuit configured to receive the operating point signal supplied by the first electronic circuit, the third electronic circuit further configured to

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supply the generator command signal to the first electronic circuit according to the received operating point signal and a generator load characteristics function selected by a watercraft operator, and the third electronic circuit further configured to supply the motor command signal to the second electronic circuit according to the received operating point signal and a gain factor selected by the watercraft operator.

Claim 34 (previously presented) The watercraft of claim 33 wherein the operating point signal representative of the said generator load operating point is a signal representative of the speed of the said generator.

Claim 35 (previously presented) The watercraft of claim 33 wherein the received generator command signal is a signal representative of the desired generator torque.

Claim 36 (previously presented) The watercraft of claim 33 wherein the generator load characteristics function of the third electronic circuit is configured as a gain factor.

Claim 37 (previously presented) The watercraft of claim 33 wherein the generator load characteristics function of the third electronic circuit is configured as a function of time.

Claim 38 (previously presented) The watercraft of claim 33, further including a photovoltaic solar panel configured to supply power to the said energy storage means.

Claim 39 (previously presented) The watercraft of claim 33 wherein the energy storage means and the second control means are arranged to supply the said electric motor substantially more electrical power than that produced by the said generator, thereby enabling the propelling of the watercraft at a speed substantially higher than that achievable via the power supplied by the said generator alone.

Claim 40 (previously presented) The watercraft of claim 33 wherein the state of charge of the said energy storage means is monitored, and the electric current flowing

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from the energy storage means is regulated to zero when the state of charge is depleted to a predetermined threshold.

Claim 41 (previously presented) A method of powering and controlling a watercraft, comprising:

- a.) providing at least one electric generator that converts human kinetic energy to electrical energy,
- b.) providing at least one electric motor and at least one apparatus for converting the motor torque to propelling thrust,
- c.) providing an energy storage means and configuring it to receive and store electrical energy, and further configuring it to supply electrical energy to the said electric motor,
- d.) providing a means of controlling the loading characteristics of the said generator according to an operator adjustable function of a load point parameter of the said generator, and
- e.) providing a means of controlling the electrical power supplied to the said electric motor as a function of a load point of the said generator.

Claims 42-45 (canceled)

Claim 46 (new) A watercraft with electric propulsion means, human power means, solar power means, and energy storage means, comprising a power amplification mode of operation wherein a combination of the said energy storage means and the said solar power means is used to amplify the power produced by the said human power means to provide enhanced power capability to the said electric propulsion means and thereby provide enhanced watercraft speed capability.

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Claim 47 (new) The watercraft of claim 46, further comprising a mode of operation wherein the said energy storage means is used to provide propulsion power without use of the human power means.

Claim 48 (new) The watercraft of claim 46, further comprising a mode of operation wherein the said solar power means is used to provide propulsion power without use of the human power means.

Claim 49 (new) The watercraft of claim 46, further comprising a mode of operation wherein the said human power means is used to provide propulsion power without removal of energy from the energy storage means.